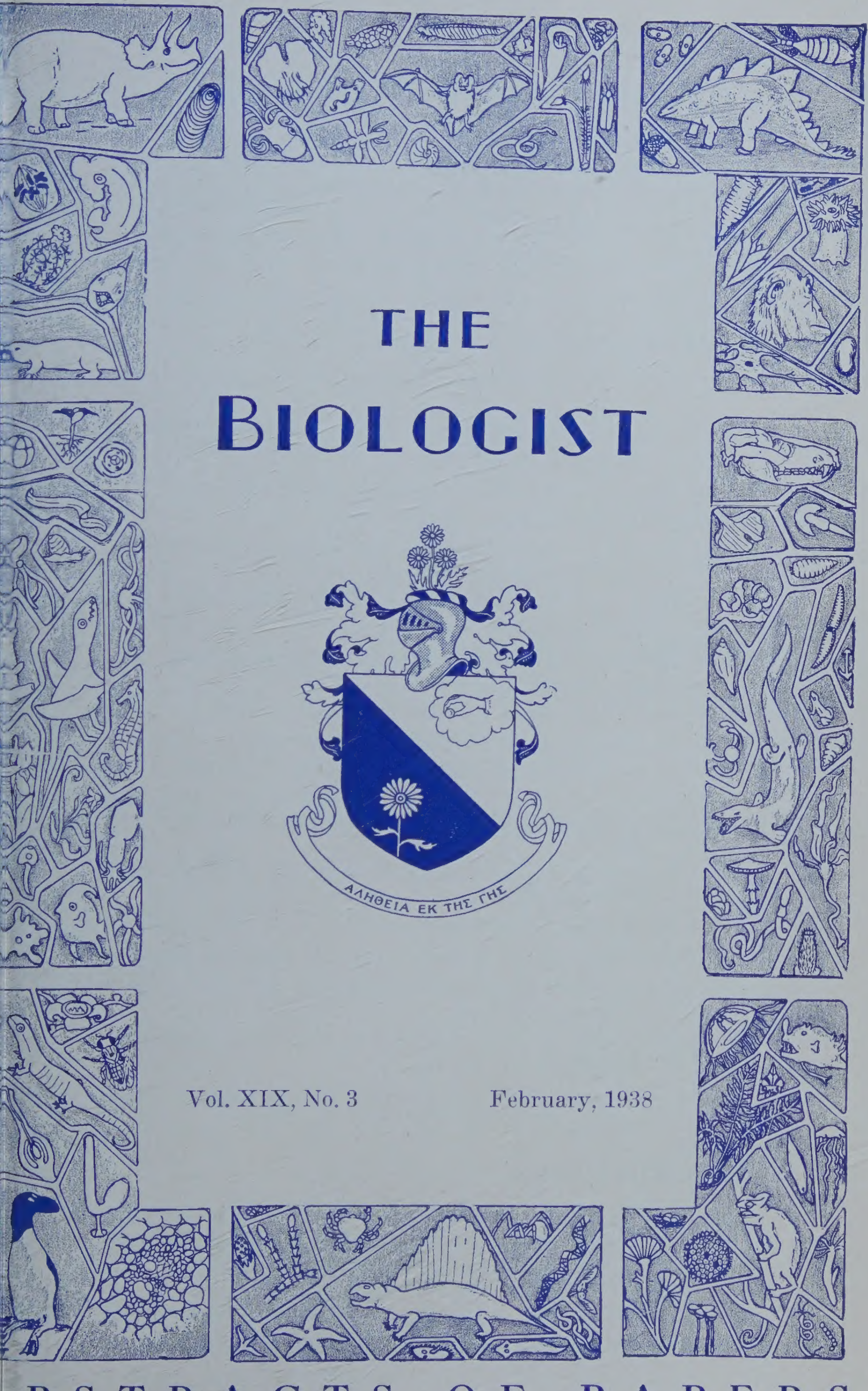
CONVENTION ISSUE



THE BIOLOGIST

ΑΛΗΘΕΙΑ ΕΚ ΤΗΣ ΓΗΣ

Vol. XIX, No. 3 February, 1938

BSTRACTS OF PAPERS

PHI SIGMA
BIOLOGICAL HONOR SOCIETY

"The object of Phi Sigma is to promote interest in biological research. Although originally designated as an honorary biological research society, it should now be considered as a working guild of biologists interested in research. In effect, election to Phi Sigma should be an opportunity for better work, rather than merely election to an honorary society."

Mile Posts:

1915 March 17, Alpha Chapter organized, Ohio State University.
1916 May, Central Governing Body organized, BIOLOGIST first issued.
1917 June, last War-time BIOLOGIST issued.
1921 February, BIOLOGIST revived.
1924 December, First National Convention, Constitution revised, Washington, D. C.
1925 December, Second National Convention, First Scientific Program, Kansas City.
1926 December, Third National Convention, Second Science Program, Philadelphia.
1927 December, Third Science Program, Nashville.
1928 December, Fourth National Convention, Coat-of-Arms adopted, Fourth Science Program, New York.
1930 January, Council Meeting, Ritual Revised, Norman, Okla.
December, Fifth National Convention, Fifth Science Program, Cleveland.
1931 Phi Sigma Letters Registered, U. S. Patent Office.
1932 December, Sixth Science Program, Atlantic City.
1933 June, Sixth National Convention, Seventh Science Program, Chicago.
1935 December, Seventh National Convention, Eighth Science Program, St. Louis.
1937 December, Eighth National Convention, Ninth Science Program, Indianapolis.

Expansion:

The Constitution provides that: "An active chapter may be established in any institution of learning which requires for graduation the equivalent of four years of collegiate work, and which is equipped with facilities for research work. - - - - Any petitioning group must be active for at least one year before it may be granted a charter."

THE BIOLOGIST

Vol. XIX Denver, Colo., February, 1938 No. 3

Copyright 1938 by the Phi Sigma Society, an organization devoted to the promotion of interest in biological research, founded at Ohio State University, March 17, 1915. The Biologist is the official quarterly publication of the society, issued ordinarily in October, December, February and April, as a medium of exchange between chapters, as an interpreter of Council policies, and as a stimulus to the fellowship in science for which Phi Sigma stands.

COUNCIL

◆

Honorary President

Dr. Alexander G. Ruthven (Beta '30)
President of the University of
Michigan,
Ann Arbor, Michigan

◆

Chancellor

Dr. Paul A. Warren (Beta '20)
Botany Department,
Tufts, College,
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Vice-Chancellor

Dr. Melville H. Hatch (Beta '18)
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Dr. A. I. Ortenburger (Beta '19)
Zoology Department,
University of Oklahoma,
Norman, Oklahoma

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Erwine Hall Stewart (Epsilon '17)
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◆

Editor

Dr. Anselm M. Keefe (Zeta '24)
St. Norbert College,
West DePere, Wisconsin

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DIRECTORY

OF ALL ACTIVE AND INACTIVE CHAPTERS

The list of chapter officers will be found in the CHAPTER NEWS section

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ALPHA

Ohio State University, Columbus, Ohio, founded March 17, 1915, (Inactive).

BETA

University of Michigan, Ann Arbor, Michigan, founded June 3, 1916.

DELTA

University of Maine, Orono, Maine, founded January 27, 1917.

EPSILON

University of Denver, Denver, Colorado, founded March 5, 1917.

ZETA

University of Wisconsin, Madison, Wisconsin, founded May 30, 1917.

ETA

University of Akron, Akron, Ohio, founded April 20, 1921.

THETA

Michigan State College, East Lansing, Michigan, founded April 9, 1921.

IOTA

Washington University, St. Louis, Missouri, founded May 28, 1921.

KAPPA

University of Kansas, Lawrence, Kansas, founded May 31, 1921.

LAMBDA

University of Montana, Missoula, Montana, founded May 4, 1921.

MU

University of California, Berkeley, California, founded April 27, 1922.

NU

Washington and Jefferson College, Washington, Pennsylvania, founded May 11, 1922.

XI

University of Nebraska, Lincoln, Nebraska, founded May 3, 1934.

OMICRON

University of North Dakota, Grand Forks, North Dakota, founded May 26, 1924, (Inactive).

PI

Emory University, Georgia, founded January 3, 1925.

RHO

University of Illinois, Urbana, Illinois, founded March 28, 1925.

SIGMA

University of Florida, Gainesville, Florida, founded December 4, 1925.

TAU

Duke University, Durham, North Carolina, founded March 4, 1926.

UPSILON

Miami University, Oxford, Ohio, founded May 7. 1926.

PHI

University of New Hampshire, Durham, New Hampshire, founded May 21, 1926.

CHI

Montana State College, Bozeman, Montana, founded February 11, 1927.

PSI

University of Washington, Seattle, Washington, founded April 7, 1928.

OMEGA

University of Oklahoma, Norman, Oklahoma, founded March 24, 1928.

ALPHA ALPHA

University of Southern California, Los Angeles, California, founded May 17, 1930.

ALPHA BETA

Mount Union College, Alliance, Ohio, founded May 17, 1928.

ALPHA GAMMA

University of South Dakota, Vermillion, South Dakota, founded May 15, 1928, (Inactive).

ALPHA DELTA

Lawrence College, Appleton, Wisconsin, founded March 7, 1929.

ALPHA EPSILON

University of Pittsburgh, Pittsburgh, Pennsylvania, founded March 23, 1929.

ALPHA ZETA

College of William and Mary, Williamsburg, Virginia, founded April 19, 1930.

ALPHA ETA

Oklahoma Agricultural and Mechanical College, Stillwater, Oklahoma, founded March 13, 1930.

ALPHA THETA

State College of Washington, Pullman, Washington, founded May, 1930.

ALPHA IOTA

Bucknell University, Lewisburg, Pennsylvania, founded January 9, 1932.

ALPHA KAPPA

Hunter College, New York City, founded January 8, 1932.

ALPHA LAMBDA

University of Utah, Salt Lake City, Utah, founded February 13, 1932.

ALPHA MU

University and State Agricultural College of Oregon, Eugene-Corvallis, Oregon, founded November 18, 1933.

ALPHA NU

University of New Mexico, Albuquerque, New Mexico, founded April 21, 1935.

ALPHA XI

Rhode Island State College, Kingston, Rhode Island, founded May 17, 1935.

SOME REMARKS ON THE ORGANIZATION OF RESEARCH IN UNIVERSITIES

By DR. ALEXANDER G. RUTHVEN, *President of the University of Michigan*

THE title of these remarks may be irritating to some investigators. Some may even be moved to comment: ''Another biologist gone wrong.'' If this has been the reaction I cannot find it in my heart to blame anyone, since I appreciate fully the scope and importance of academic freedom. I thus hasten to assure you, as I take up the consideration of my theme, that by ''organization of research'' I do not mean regimentation of research workers. My contention is that investigators should not ignore the reasons why direction of investigation must receive some attention from harassed administrators, and my aim is to discuss briefly the possibility of securing the advantages of organization without the disadvantages of regimentation.

College presidents and deans of graduate schools have from time to time proposed that research activities in their schools be more carefully defined and integrated than they usually are in our institutions of higher education. Being responsible for the efficient use of funds, they have now and then expressed uneasiness as they have observed the haphazard nature of creative activities, the tendency to lose sight of the original purposes for which funds have been given, and the frequency with which time limitations of grants are disregarded.

Admittedly, scientific study, like other kinds of creative work, requires for the investigator considerable freedom to explore the ramifications of his problems. ''Factory made research'' is uninspired research and little more than an intellectual chore. Originality in thinking is, as is well known, largely the result of curiosity and can only to a limited extent be promoted by dictation. Even if it were not true that significant discoveries are generally the product of free minds with an insatiable curiosity, our colleges and universities would still do well to place as few restrictions as possible upon thought and study. The ability to think and the incentive to add to the sum total of human knowledge are still all too rare even in our schools, and both are stimulated in the student by the opportunity to observe able and free minds in action, even when the studies in which these minds are engaged are concerned with such immediately impractical and apparently "useless" problems as involve the anatomy of the left hind-leg of the cockroach, the deciphering of an ancient love letter on papyrus, or the vagaries of immoral fruit flies.

While we may be reluctant to admit it, opportunity for untrammeled exploration sometimes leads to desultory ramblings which, while as pleasant as leisurely strolls through a charming countryside, yield little of permanent value, except exercise and individual satisfaction, for the reason that they arrive nowhere. Grants-in-aid of research are seldom requested or made for the purpose of making life pleasant for the investigator. They are generally accepted on the condition, or at least in the expectation, that a specific problem will be attacked or a restricted field of human knowledge will be explored. Very often time limitations are prescribed in the deeds of gift, but whether they are or not, college administrators are at least morally responsible for carrying out the implied as well as the stipulated conditions attached to funds provided for investigations.

The delicate business constantly before those who administer the affairs of institutions in which research is fostered is to determine how much freedom can be given to the investigator without breaking faith with donors and without sacrificing efficiency in productive scholarship. It should be seen clearly by everyone concerned that this task cannot be performed satisfactorily by forcing students or staff members to attack problems in which they are not interested, by insistence upon rigid time schedules, and certainly not by permitting indefinite expansion of the scope of investigations or by adopting the catch as catch can method of securing aid for research. Such procedures destroy freedom. A better way would be to restrict the spread of original studies and, if possible, to organize the facilities for research, including the staff, about carefully selected problems. This conclusion is confirmed as one views certain influences in the present-day environment of our schools.

Our colleges and universities are definitely facing several changes in social conditions and are responding, although slowly, to the resultant educational trends. Increasing taxes and better recognition of social needs are together promising a slower rate of growth in school appropriations. Ease of transportation is giving students a wider choice of schools and thus bringing about duplication in educational facilities. Knowledge has increased so enormously that investigators and teachers must specialize in ever smaller areas, co-operate in the solution of the larger problems, and have greater opportunities for association with colleagues in related fields. The schools are fast discovering the impossibility of effectively cultivating the whole area of human knowledge—the danger of spreading themselves too thin in instruction. Specifically, the divisions of the sciences are themselves so extensive and varied that not even our largest institutions can hope to obtain sufficient funds to offer work in all of the subdivisions which are recognized. As a consequence of this general situation, educational administrators are coming to see that a rather thoroughgoing regional distribution of educational activities must be encouraged by the schools if they are not to lay themselves open to the accusation of engaging in unseemly competition, of fostering mediocrity, and of providing inadequate facilities for the staff.

I submit that as our institutions of higher learning co-operate in, or are forced to accept, regional distribution of activities they will not only improve teaching but they will also take an important step toward a proper systematizing of research. In large degree research follows teaching, and, when specialized fields of instruction are distributed, fields of investigation will also, generally speaking, be apportioned among the schools. It would seem logical that the plan of emphasizing major fields of research might be carried further in each institution in order to eliminate the evils of unorganized investigations. I, therefore, make bold to suggest for individual schools: first, that periodically the interests of staff members and the facilities for study be surveyed and research programs be reformulated and adopted by the faculties with the understanding that they are to be followed for definite periods of time; second, that staffs be built around programs of research as well as about programs of teaching; and, third, that opportunities to promote investigations outside of the accepted fields be in general ignored.

Surely such a plan of organization would not place faculty members in strait-jackets. It should rather set them free, forward discoveries by providing additional opportunities for study, and increase the probability that the aims and hopes of benefactors will be realized. It should give to the investigator the only liberty which is valuable, that associated with order, with individual aptitudes and habitudes, and with the good of the greatest number as democratically conceived.

LOST AND FOUND!

After the close of the last business session of the Phi Sigma convention at the Lincoln Hotel in Indianapolis, a mottled gray fountain pen was found on the floor. If the owner will write to me I shall be glad to see that it is returned.

ANSELM M. KEEFE, *Editor*,
St. Norbert College, West DePere, Wis.

REPORT OF THE NATIONAL SECRETARY

DR. A. I. ORTENBURGER, *University of Oklahoma*

CONTRARY to my usual tendency I am trying to make this report as brief as possible in order that more time may be available for other business and what is even more important, that you may attend other A.A.A.S. meetings.

Since my last report given at St. Louis on December 30, 1935, many things have happened. You may read about practically all of these in the issues of the *Biologist* sent to your chapters since that time so I won't go over them again now. I am, however, expected by tradition of the Society to give a report—so here goes:

No new chapters have been installed in the past two years; this is a matter which should receive your careful attention. I have during this time received letters from clubs at nine institutions. These have been answered promptly and the necessary information sent to them. There have been no further results.

Moreover, two chapters have become inactive: Xi, at Nebraska, and Alpha Delta at Lawrence College.

The number of individuals initiated has dropped somewhat, as would be expected. While 649 were initiated three years ago this number dropped to 584 two years ago and 580 last year. This is a decrease of about 10%, but nevertheless, this lower number is actually higher than four or five years ago. There are 32 active chapters at present. The present status of one, Theta, at Michigan State College is doubtful.

Just last month the National Research Council published its Third Edition of *Scientific and Technical Societies of the United States and Canada.* Of nearly forty possible honorary and professional scientific organizations listed in Banta's *Greek Exchange*, only eight are given, Phi Sigma is one of them. Here we are in good company with such as Alpha Chi Sigma (Chemistry), Sigma Xi, Gamma Alpha, and Sigma Pi Sigma (Physics).

As usual, another edition of the constitution, the eleventh, has been printed. This edition includes all changes authorized by the Society after the convention of December 1935. I feel that our constitution has in the past been changed in little ways, too often. A constitution should be a permanent thing, not impossible of change, but not something for each convention to play with and modify here and there with too little thought. Most proposed changes brought up for consideration in former years have been in the nature of local matters which should not be incorporated in any constitution. Our constitution has now stood the test of time, and as years go on should seldom require modification. It has worked, it is working. Phi Sigma is now a Society which is no longer a mere infant, whose future is a bit uncertain because of unknowns in its diet and nourishment. It should be past the diseases of early childhood. It should be able to stand on its own feet at its present age of 22 years. Its pattern of behavior should be well established. It should know what it is doing and what it plans to do.

I will not bore you with details of my office. Perhaps the one thing which makes my work more difficult than anything else is something which is no fault of yours and probably a matter which cannot be rectified. I refer to the difficulty of making contact with chapter officers at the beginning of each school year. Much time, postage, and effort are wasted. Enough of this before I begin to sound like the speaker who took ten minutes to scold those present, his audience, for those not present.

May I in passing, however, remind you of one matter which most chapters seem not to appreciate. Your national officers make every effort to answer all letters promptly and take care of society business in a business-like fashion. But please remind your chapters when you return that all of us have other jobs which must also be attended to; that none of us is on a salary and can afford to devote all of his time to Phi Sigma. Yet, in spite of this, I think all of you will admit willingly, that we have been prompt and at least fairly efficient in handling the business of our offices.

It is not my place to report upon the *Biologist*, but I do wish to say that under the able editorship of Dr. Keefe, our publication has continued to improve in many noticeable ways. One of the best things the council ever did was to relieve me of the responsibility of the editorship and pass it on to someone more capable.

A word is in order also about our most loyal and efficient treasurer, Mr. Stewart. He has a real job, which he does well and without help or cost to the Society. You will find him, as I have, an outspoken man of definite opinions and more than that, he is practically always right, as I have come to learn in the past several years—nine to be exact. I suggest that when he speaks to you concerning any Phi Sigma matter you listen with both ears, as one should respect the judgment of one with twenty years experience with our society, and as a national officer of various other national organizations as well.

This year a change of policy was begun in regard to our Convention. For the past two or three conventions a great deal of emphasis has been placed upon our scientific program. This was proper, well worth while, and very successful, but it seemed to the council that after all perhaps the delegates would get more good out of their trip if they were allowed more time to attend meetings of other societies associated with the A.A.A.S. rather than remain with their own group all of the time. For this reason our program is purposely shorter this year than at the last convention. Perhaps at the next convention we will have no scientific program of our own. There are many points in favor of this rather radical change, that is for you to decide.

Another possibility worth serious consideration is that of having our meetings just before or after the main meetings of the A.A.A.S. This would allow delegates to attend all of the other meetings they cared to attend.

In a well-run society as in a well-run scientific expedition, emergencies do not occur, because they are anticipated; spectacular escapes from annihilation should not happen. Results are expected and come about as the result of careful planning and advance knowledge. Phi Sigma has been developing and carrying on as it should, not in a spectacular manner but in a sane even way, gaining the respect of all.

You have at this convention the privilege, and serious responsibility of electing new national officers, a chancellor and a treasurer, or of re-electing one of both. Do not be misled by the idea that big names would lend dignity to Phi Sigma as its officers. We are past the stage of needing such artificial propping up. The men you elect should be men you are sure will work and not be mere figureheads; men whose judgment you can trust; men who will give the necessary time; men who are not local in their thinking; men who have no direct connection as members which were elected by the chapter where they happen to be although of course this need have no undesirable effect. It so happens that at present none of your officers is a member of the chapter where he happens to be. I think that this is possibly a good thing. Also three of the five are at places where there is no chapter at present. Above all, however, do be sure that the men you elect now, or at any future convention, will really work, and work without delay, for anything that Phi Sigma requires. We honor one outstanding biologist each four years by electing him to the office of National President. This office is honorary. One such office is a fine thing, but one is sufficient.

In conclusion may I make one request; I think I speak for the other members of the Council, as well. Consider all matters which will be brought on the floor of the convention in a logical, rational, unhurried manner. Don't allow yourself to be misled by the ideas of one or more delegates who represent honestly of course, perhaps only a local group. Phi Sigma stands or falls as an organization of national scope, otherwise we could do away with these conventions entirely. Think about everything from a national standpoint. Your sound sense of judgment is the important thing, not the oratory you will hear. Remember that if any of your national officers do not agree with you, we will say so. We have, just as you have, the good of our society at heart.

⁂

CONVENTION MINUTES

Parlor L, Lincoln Hotel, Dec. 28, 1937, Indianapolis

Meeting called to order by Chancellor Warren at 9:02 a.m.

Presentation of delegate certificates as follows:

Beta,—Wayne Whitaker; Epsilon,—Hugh C. Capps, Jr.; Zeta,—G. Worley; Eta,—William H. Ireland; Iota,—H. Garland; Kappa,—Charles Wolfson; Lamda,—Mary L. Clapp; Mu,—Thomas H. G. Aitken; Nu,—W. M. McConahey, Jr.; Pi,—Morris S. McKeehan; Rho,—Paul Meglitsch; Sigma,—K. B. Swinford; Tau,—John C. Ayers; Upsilon,—Hubert Bezdek; Phi,—Eleanor L. Sheehan; Chi,—Peter H. Matisheck; Psi,—W. M. Lauphere; Omega,—Charles Smith; Alpha Alpha,—P. J. Rempel; Alpha Beta,—John Smith; Alpha Epsilon,—Edna Higbee; Alpha Zeta,—Mary Davis; Alpha Eta,—Ray Murell; Alpha Theta,—Jack R. Nail; Alpha Iota,—Jerome Herbert Kantor; Alpha Kappa,—Alwin Winstein; Alpha Lambda,—Marie R. Kay; Alpha Mu,—Banner Bill Morgan; Alpha Nu,—Charlotte Goodding; Alpha Xi,—Harry Turner.

Announcements.

Report of Committee on Organization (9:20)—Credentials of all present satisfactory.

Introduction of delegates, national council and past national officers present.

Delegates absent—Pi, Upsilon, Alpha Kappa, and Alpha Xi. (All arrived later.)

Report given of council meeting held previous afternoon and evening given by National Secretary Ortenburger (9:55).

Report of Editor of the Biologist (10:19).

Report of National Treasurer—

Summary—

Endowment fund	$1105.63
Biologist fund	624.82
General fund	99.96
Convention fund	3281.76

(This last amount cannot be given *exactly* until after all bills for convention are in.)

Appointment of committees—

- Auditing—
  - W. H. Ireland—Eta Chr.
  - Charlotte Gooding—Alpha Nu
  - Henry Turner—Alpha Xi
- Amendments—
  - Hugh Capps—Epsilon Chr.
  - Wayne Whitaker—Beta
  - T. Whorley—Zeta
  - T. G. Aitken—Mu
  - R. Morrell—Alpha Eta
  - A. Winstein—Alpha Kappa
  - P. J. Remple—Alpha Alpha
  - Mary Davis—Alpha Zeta
- Biologist—
  - W. M. McConahey—Nu Chr.
  - B. B. Morgan—Alpha Mu
  - Eleanor Sheehan—Phi
- Resolutions—
  - Edna Higbee—Alpha Epsilon Chr.
  - Mary L. Clapp—Lambda
  - Paul Moglitsch—Rho
  - K. P. Swinford—Sigma

Committees to report in order appointed.

Discussion of recommendations of council—

1. Recommendation on order of business and arrangements for convention.

   No discussion.

2. The National Council recommends that—

   The convention authorize the elimination of the General Academic Assessment (hereafter called the G.A.A.) for two years under a suspension of the rules and that the Convention further authorize the transfer of necessary funds from the convention fund.

Discussion—Mr. Stewart first explained the convention fund. This was followed by discussion by the delegates of the following chapters in the order given. (Hereafter as names of chapters are listed under discussion of any matter they are given in order as they spoke) Alpha Epsilon, Zeta, Mu, Stewart, Zeta, Warren, Beta, Kappa, Alpha Mu.

Stewart, Mu, Iota, Alpha Kappa, Iota, Alpha Epsilon, Alpha Kappa, Alpha Epsilon.

Moved by Beta that the National Council recommendation No. 2 as given above be passed.

Seconded by Mu.

Carried by a unanimous vote.

3. The National Council recommends that—

    The Convention authorize the *annual public* award of a scholarship medal for excellence in biological work to a *student*, *not* necessarily a member of Phi Sigma, on each campus where there is an active chapter of Phi Sigma. The method of selection of the recipient is to be determined by the biological faculty of the institution. Funds for this award are to be provided from the endowment fund.

Moved by Tau that National Council recommendation No. 3 given just above be passed.

Seconded by Alpha Eta.

Discussion—Kappa, Phi, Iota, Alpha Iota, Phi, Alpha Eta, Warren, Zeta, Keefe, Zeta, C. I. Reed (former Nat. Sec.), Keefe, Iota.

Motion to adjourn at 11:55 a.m.

The afternoon meeting was given to the reading of papers.

Second business session, Wednesday morning, Dec. 29, 1937.

Roll call at 9:00 a.m.

Further discussion of motion on N. C. recommendation No. 3.

Discussion—Mu, Alpha Mu, Alpha Epsilon, Alpha Kappa, Alpha Theta, Alpha Mu.

Motion of yesterday carried unanimously.

Report of Auditing Committee (9:12)—

''The books of the National Treasurer were examined by the committee and found to be in good order. A statement of a Registered Accountant was presented as of Dec. 22, 1937 when the books were examined by the accountant.

''The Endowment fund at present has $1105.63 on investment plus interest.

''The Biologist fund, $624.82.

''The general fund, $99.96.

"The Convention fund, to date, $3281.76. A complete balance of this fund cannot be presented until all of the Convention statements are in to the Treasurer. This should be balanced by January 3, 1938.

"Respectfully submitted 12-29-37.

"Wm. H. Ireland Chr."

Moved by Alpha Kappa that report of Auditing committee be accepted.

Seconded by Mu.

Carried.

Report of Biologist Committee—

"The majority of this committee recommends the suspension of rules and the changing of initiation fee to $3.50 of which only $0.50 (fifty cents) shall be used for the Biologist which shall be published in mimeographed form and which shall contain:

1. Biennial report of the National Secretary
2. Annual report of the Treasurer
3. Research notes
4. Unusual chapter notes
5. Council announcements

Signed:
Banner Bill Morgan
Eleanor L. Sheehan

"The minority of this committee recommends that the Biologist be continued in its present form.

Signed:
W. M. McConahey Chr.

Moved by Epsilon that minority report be accepted.

Seconded by Alpha Epsilon.

Discussion—Mu, Keefe, Stewart, Zeta, Kappa, Tau, Beta, Mu, Iota, Alpha Kappa, Phi, Upsilon, Psi, Kappa, Nu, Omega, Ortenburger, Kappa Mu, Keefe.

Vote taken by roll call. *Passed.*

All delegates voted for this motion except Iota, Kappa, Phi.

Report of Resolutions Committee—

"Be it resolved that a vote of thanks be tendered the local committee of the American Association for the Advancement of Science in charge of the Indianapolis meeting through a letter by the National Secretary of Phi Sigma Society.

Be it resolved that a vote of thanks be given the National Officers for the successful conduct of the Society during the past two year period.

Be it resolved that the Editor of the *Biologist* be commended for the excellent conduct of his duties and his present policy of promoting the *Biologist,* in so far as is possible, as a self-supporting magazine.

Be it resolved that each chapter delegate take back to his or her chapter the idea of supporting the editor of the *Biologist* and his present policy, in various concerns that might be interested in placing paid advertisements in the *Biologist.*

Be it resolved that in the future every possible effort be made to arrange the meetings of the convention of Phi Sigma so that they will occur either before or after the main meetings of the Biological sections of the American Association for the Advancement of Science and conflict with said meetings as little as possible.

Be it resolved that this convention consider the matter of shortening the time limits for the presentation of scientific papers and the strict enforcement of any time limits that may be fixed prior to the convention date.

In as much as this Resolutions Committee has been illegally instructed (the constitution makes no provision for such action on the part of the Chancellor) to omit the term *"whereas"* from its resolutions, thus hampering the individual and collective native abilities of the members of aforementioned committee, be it hereby resolved that future committees on Resolutions be permitted to use the term whereas.

Signed this 23rd day of December 1937 A.D.
K. B. Swinford
Secretary of the Committee
Mary L. Clapp
Paul A. Meglitsch
Edna Higbee, Chairman

Moved by Alpha Iota that report be accepted.
Seconded by Eta.
Carried. (10:00 a.m.)

Report of Committee on Amendments.

1. Amendment to Article III, Sect. 1 shall be amended to read as follows:

An active chapter may be established in any institution of learning, which requires for graduation the equivalent of four years of collegiate work, and which is equipped with facilities for research in biological sciences to such an extent that at least one degree beyond the Bachelor's degree may be earned from that institution for biological research pursued there.

2. A proposal to the effect that the word *meeting* instead of convention be inserted throughout the constitution.

Respectfully submitted by
Hugh O. Capps Chr.

Moved by Mu that each amendment be discussed separately.
Seconded by Kappa.
Carried.

Beta moved adoption of first proposed amendment.
Seconded by Alpha Kappa.
Discussion—Omega, Alpha Alpha, Warren, Zeta, Eta, Alpha Kappa.
Carried.

Moved by Zeta—that the word "biological" be inserted between the words "the" and "research" i.e. "for biological research"; further that the word "the" be stricken out between words "for" and "research." (This in Art. III, Sect. 1.)
Carried.

Second proposed amendment:
Moved by Alpha Eta that the word "meeting" be substituted for the word "convention' throughout the constitution.
Seconded by Mu.
Carried.

New Business.
Moved by Kappa "That we strike out word convention wherever it occurs in constitution and the word meeting be substituted therefore."
Seconded by Alpha Alpha.
Carried.

Zeta moves—a resolution that at least one month before the time of a convention (meeting) for the National Council shall send to each chapter an official test of agenda for the convention (meeting).
Seconded by Upsilon.
Discussion—Eta, Alpha Eta, Mu, Alpha Zeta, Zeta, Keefe, Alpha Zeta.
Carried.

All delegates voting for this except—Eta, Nu, Sigma, Tau, Upsilon. Chi, Omega, Alpha Zeta, Alpha Eta, Alpha Lambda and Alpha Mu.

Beta moves that $1.00 assessment for not buying a key be dropped. (This is in reference to last sentence to By-Laws, Sect. 1a.)

Seconded by Alpha Kappa.

Discussion—Beta, Upsilon, Stewart, Alpha Iota, Alpha Alpha, Keefe, Eta, Alpha Alpha, Lambda, Alpha Mu, Mu, Alpha Kappa.

Chair requests Beta to move that that part of the last sentence of By-Laws Sect. 1a. following the semi-colon be struck out.

Beta so moves.

Alpha Kappa seconds.

Motion lost.

Those voting *for* this last motion were—Beta, Epsilon, Zeta, Eta, Iota, Kappa, Nu, Tau, Phi, Chi, Alpha Iota, Alpha Kappa, Alpha Xi.

Lambda moved that a payment of $1.00 be collected at time of initiation unless that initiate purchase a key at that time.

Discussion—Alpha Kappa, Keefe, Stewart, Warren.

Motion lost.

Alpha Zeta moved that in the interim the National Council or a committee appointed by the National Council consider possible other methods of swelling the endowment fund.

Seconded by Iota.

Carried. (11:10)

Omega moved that each chapter secretary submit to the National treasurer a list of initiates indicating those who purchase keys and those who do not, accompanied by payment of $1.00 each for those not purchasing keys.

Seconded by Alpha Eta.

Discussion—Nu, Epsilon, Omega, Stewart, Kappa, Pi.

Motion lost.

Phi moved that Sect. 1a, third sentence be changed to—Of the remaining $3.00, $2.00 shall go to the local chapter and $1.00 to the National Treasurer for endowment fund.

Seconded by Alpha Zeta.

Discussion—Zeta, Stewart, Iota, Beta, Alpha Kappa.

Motion lost. (11:30)

Alpha Kappa moved an amendment to constitution Art. VII, Sect. 1 to read—"The number of regular meetings to be held each school year shall be left to discretion of each local chapter."

Discussion—Alpha Kappa, Alpha Mu.

Motion lost.

Election of National Officers called for.

National Treasurer.

Tau nominated E. H. Stewart.

Seconded by Alpha Zeta.

Zeta nominated H. G. Owen.

Seconded by Kappa.

Psi moved that nominations be closed.

Seconded by Mu.

Carried.

Discussion—Epsilon, Tau.

Mr. E. H. Stewart re-elected.

Zeta moves re-election by unanimous vote.

Mu seconded.

Carried. (11:50)

Election National Chancellor.

Mu nominated Professor W. B. Herms.

Seconded by Kappa.

Alpha Alpha nominated P. A. Warren.

Eta seconded.

Beta nominated L. E. Nolan.

Phi seconded.

.... nominated W. B. Baker.

.... seconded.

Alpha Epsilon moved nominations be closed.

Tau seconded.

Carried.

Chair taken by Vice-Chancellor Hatch.

Discussion—Psi, Beta, Epsilon, Mu, Beta, Zeta, Pi, Alpha Epsilon, Zeta, Kappa, Lambda.

P. A. Warren re-elected.

Alpha Alpha moved that secretary cast a unanimous vote for Dr. Warren.

Carried.

Seconded by Mu.

Kappa moved that a National committee be established, appointed by the National Chancellor to foster and investigate new chapters.

Seconded by Alpha Mu.

Discussion—Zeta Kappa.

Carried. (12:20)

Iota moved that the editorial policy of the *Biologist* should be subservient to the primary aims of the Society, the stimulation of research in biology. The function of publicity shall be secondary.

Seconded by Kappa.

Discussion—Upsilon, Alpha Epsilon, Eta.

Carried.

Kappa moved that one month prior to each National Convention (Meeting) the detail report from the National Secretary and National Treasurer be mimeographed and sent to the chapters.

Seconded by Mu.

Discussion—Stewart, Kappa.

Carried.

Those voting *against* this motion were: Epsilon, Pi, Upsilon, Psi, Omega, Alpha Eta, Alpha Theta, Alpha Kappa, Alpha Lambda, Alpha Xi.

Kappa moved that he be allowed to discuss motion to be made before making it.

Seconded by Zeta.

Motion lost.

Kappa moved that any active chapter be privileged to call upon the National Chancellor to appoint a committee of 3 active members in three different chapters to consider and to report out at next following national meeting any special problems which it considers of national scope.

Seconded by Alpha Mu.

Discussion—Kappa Pi.

Motion withdrawn.

Zeta moved that its suggestion No. 4 as given in *Biologist*, Vol. XIX, No. 2, p. 74 be passed.

Seconded by Mu.

Discussion—Mu, Alpha Kappa, Pi, Iota, Omega, Pi, Zeta.

Zeta withdraws motion.

Zeta moved that scientific sessions of our Society be limited to one afternoon and all papers read must be read by the author.

Carried.

Kappa moved to abolish the scientific session beginning at 2:00 p.m. today.

Ruled impossible by Chancellor, because already published in program of A.A.A.S.

Motion to adjourn (1:10 p.m.)

Afternoon session beginning at 2:00 p.m. for reading of papers.

Dinner at 6:30 p.m. Florentine room of Claypool Hotel. Dr. A. G. Ruthven, President of the University of Michigan and President of our society spoke on "Some Remarks on the Organization of Research in Universities."

* * *

ABSTRACTS OF PAPERS

Read at the Indianapolis Sessions of the A. A. A. S., Dec. 28, 29, 1937.

1. ASSORTATIVE MATING IN THE EARTHWORM, LUMBRICUS TERRESTRIS L.

Hugh C. Clark
University of Michigan.

The material for the study consists of two hundred seventy-six pairs of earthworms which were collected while mating. From these data are described (1) size variations of populations of earthworms with respect to locality and season; (2) quantitative findings on the existence and degree of homogamy in Lumbricus terrestris L.; and (3) the significance of the mechanism of mating in another hermaphroditic form.

2. MORPHOLOGICAL AND EXPERIMENTAL STUDIES OF THE UROGENITAL SYSTEM OF URODELES OF THE GENUS TRITURUS.

Edna Higbee, Ph.D.
University of Pittsburgh.

The work deals with the effects of castration; supersexing; testicular grafts in castrated female animals; testicular implants in castrated male animals and ovarian grafts in castrated male animals.

The results obtained show (1) Supersexing causes the secondary sexual characters to appear oftener and remain visible for a longer period of time than they do in normal Triturus males. (2) In one castrated viridescens female, the engrafted testis tissue caused the appearance of some of the secondary sexual characteristics of the males on two occasions during the period following the operation until the death of the animal. (3) Testis grafts were found upon gross observations to persist in the host's body for more than two years without becoming modified in external structure. (4) Under microscopical examination of engrafted material, the cellular structure of the implants resemble normal tissue as long as 224 days after implantation. (5) In supersexed males, as well as in viridescens castrated with torosus implants, the glands of the cloaca increase in number. (6) Transplanting of two testes into a castrated female causes the development of the three sets of male glands in the cloacal walls of the female. (7) Gonad material becomes established whether in the presence or absence of host's sex hormones.

3. A STUDY OF THE BREEDING DISTRIBUTION OF BIRDS IN A TYPICAL UPLAND AREA.

Ralph M. Edeburn
Cornell University.

This study was undertaken with the desire to clarify some of the conflicting activities in Wildlife Management. The author, as well as others, feels that many habitat alterations have been made without enough scientific evidence to justify such changes.

The data was collected from a three-year study of one-half of a small water-shed in Beaver County, Western Pennsylvania. The area comprised one hundred thirty acres, having a great variety of habitats.

The report shows graphically the actual breeding conditions for each of the fifty species of birds found breeding in the area, and an analysis of each. This analysis includes a summary of birds found, a paragraph on the validity of the singing male for a breeding census, a discussion of the limiting factors of each species and suggestions for increasing its abundance.

The summary maps show the total of all species in relation to habitat and the discussion attempts to explain some of the habitat complexes desirable for birds. On the basis of this data a Game Refuge Plan and a Bird Sanctuary Plan were developed showing how such an area might be improved.

A few generalizations are here included: (1) Pure stands of any type of vegetation harbor a low breeding bird density. (2) There is a direct relation between the amount of border and bird density. (3) The arrangement of cover types in respect to each other is of utmost importance. (4) Birds breed in suitable nesting habitat in or near to an abundant food supply. (5) Mixed permanent thicket possessed a greater breeding density than any other type of habitat included in the study.

4. MULTIPLE ECTOPIC GESTATION IN THE RABBIT WITH EVIDENCE FOR TRUE ABDOMINAL PLACENTATION.

Russell Perry Hager
University of New Hampshire

A case of primary implantation outside of the uteri and oviducts was found in a doe in a colony of rabbits maintained for breeding experiments. In the abdominal cavity there were six dead full-term foetuses with fully developed placentae. Two small placentae were found implanted on the omentum. Since the animal had been mated thirteen and a third days previously, and since these placentae were smaller than the size of normal placentae of thirteen days pregnancy, it is inferred that these were from that mating and had escaped from the reproductive tract. There was no sign of rupture on the oviducts or uteri. A brief review of recent literature presents evidence supporting the thesis that this was a case of primary implantation outside of the uteri and oviducts. Previous accounts of abdominal pregnancy describe secondary ectopic gestation following rupture of oviducts and uteri. These discredit the possibility of initial implantation occurring naturally outside of the reproductive tract.

5. LIGHT-ELECTROCUTION METHOD OF INSECT CONTROL.

Joe K. Ellsworth
University of California.

Abstract: Electricity plays a new role in Agriculture. It enters the field of entomology as a destroyer of those insect hordes with which the farmer must compete. Although, the use of light to attract insects was not new, we believed that the use of colored light as an attrahent coupled with the lethal effect of high voltage current was new in the art. The principle object of this investigation has been to control insects and to obviate poisonous residues. The development of suitable equipment paralleled our investigation on the reactions of insects to monochromatic lights.

Based on four years of field experience with the grape leafhopper, one trap per acre is recommended. Pale blue light is used. It attracts 88 per cent females. The cost of installation is between $25 and $35 per acre, depending upon the arrangement of the vineyard. The device uses 70 watts. The operating cost varies from $.38 to $1.72 per acre for the season, depending on the number of traps and the local power rate. White incandescent lamps are also used for protection against annoying insects and to provide food for insectivorous animals.

Appropriate color and proper light intensity are essential for successful insect control.

6. THE ROLE OF TICKS IN THE TRANSMISSION OF ANAPLASMOSIS.

D. E. Howell
University of California.

Abstract: In 1910 A. Theiler discovered the causal agent of Anaplasmosis, a serious disease of cattle; since then it has been found in

most of the tropical and subtropical regions of the world and may extend into colder countries.

Anaplasmosis may be transmitted by accidental inoculation or biologically by ticks. Work at this laboratory has incriminated three species of ticks, *Dermacentor occidentalis*, *D. albipictus* and *D. andersoni.* In the first two the infection passed through the larva, nymph and adult; and in *D. occidentalis* congenital transmission was obtained by means of larvae whose mother had fed on a cow with Anaplasmosis.

The life history of *D. occidentalis* and *D. albipictus* has been worked out for these ticks under California conditions and control measures considered.

7. THE MATING PROCESS IN THE PACIFIC COAST NEWT, TRITURUS TOROSUS.

Robert E. Smith
University of California.

The male newts move into the ponds for breeding prior to the arrival of the females. After preliminary transformations from a terrestrial to an aquatic condition the males are ready to mate. The females are usually seized immediately upon entry by the waiting males. A period of amplexus ensues, during which the male assumes a position dorsal to the female, clasping her about the body with his forelegs and sometimes the hind as well. The length of the amplectic period is extremely variable. Throughout amplexus the male maintains vigorous courtship activities; the female remains generally passive. At the peak of his excitement the male crawls off over the head of the female to the substratum where, during concomittant clonic spasms, he deposits the spermatophore. Apparently acting under stimulus of male cloacal secretions, the female passes over the spermatophore; the sperm capsule adheres as it contacts her cloaca. Amplexus is resumed following the deposition.

In the laboratory several incompatible matings have involved a state of indifference of the female to the male at time of sperm emission. Present investigation is being directed toward the factors responsible in such instances.

8. AN ECOLOGICAL STUDY OF CALIFORNIAN COASTAL *Anopheles pseudopunctipennis* Theob.

THOMAS H. G. AITKEN
University of California.

Abstract: During the summer of 1937 an anopheline mosquito survey, primarily of the Californian coast, but which also included portions of the interior, was conducted by Prof. W. B. Herms (Division of Entomology and Parasitology) of the University of California, Dariel E. Howell, and the author (graduates in Entomology and Parasitology).

Particular attention was given *Anopheles pseudopunctipennis,* as we noticed its extreme prevalence in this coastal region. It was taken in an almost unbroken line from Wonderland Park, Del Norte County (approximately 20 miles south of the Oregon line) to San Ysidro, San Diego County on the Mexican border.

An arbitrarily selected series of habitats, useful only in pointing out the kinds of places in which larvae may be found, is discussed. One was almost sure to find *A. pseudopunctipennis* wherever water was encountered in which patches of algae (Spirogyra) existed partially above the surface. These dense masses of plant growth are not only sources for food and places of refuge from marauding minnows, but they are areas of increased oxygenation. Although other floral types undoubtedly play important roles in regulating breeding activities, the results of this survey indicate that algae are most significant.

9. THE EFFECT OF POTASSIUM ON THE ELECTRICAL POTENTIAL OF FROG SKIN.

LEONARD I. KATZIN.
University of California.

Upon the replacement of potassium-free buffer solution, on either side of the mounted frog belly skin, by buffer to which has been added KC1 to the amount of 0.002 M KC1, there is no appreciable effect on the potential, other than a slight steadying tendency, or in addition a very slight rise of the potential, the latter being probably not significant. If the replacing solution is 0.02 M in KC1, however, there is a strong depression of the potential, irrespective of the side of the skin to which the potassium solution is applied.

These results make it very unlikely that the potential is due to a gradient of potassium ion through the skin, or to a difference of concentration of potassium on the two sides of the skin.

10. A METHOD OF TISSUE CULTURE APPLICABLE TO ANY BACTERIOLOGICAL LABORATORY.

W. A. McOmie
University of California.

A method of tissue culture is outlined which does not employ any techniques not already in general use in bacteriology. The three essential constituents of a successful tissue culture are blood plasma, tissue extract and tissue fragments. Blood plasma is collected from rabbits using heparin as an anticoagulant. Blood plasma from other animals may also be used. Tissue extract is prepared from chick embryos by grinding them in a tissue grinder and diluting the pulp with Tyrode's solution. The supernatant resulting from the centrifugation of this mixture is termed embryonic extract. The tissue commonly used for culturing is the chick embryonic heart. Many other tissues have been successfully cultivated. The three constituents are combined in the usual fashion using ordinary serologic pipettes for the measurements. Carrel flasks are used for containers. However, if Carrel flasks are not available other containers may be substituted. Embryonic tissue shows growth within eight hours in such a medium as the above and reaches a maximum in about seventy-two hours. Heart fragments show a dense growth of the so-called "fibrablasts" around their periphery.

11. A BACTERIAL DISEASE OF THE MILKWEED BUG, LYGAEUS KALMII.

Howard Weedon Smith
University of New Hampshire.

In the fall of 1936 a laboratory culture of the milkweed bug, Lygaeus kalmii, became infected by a septicemial disease. Upon bacteriological examination a short, Gram negative rod was considered to be the causative agent.

Determination of the characteristic reactions of the organism led to its placement in the genus Proteus, and as no reference was found in the literature the name Proteus kalmii n. sp. is proposed.

Proteus kalmii is a short rod, Gram negative, non-capsulate, and non-spore-forming. Colonies on agar are moderate in size, smooth, shiny, and white. Growth in or on any medium is rapid, and at an optimum temperature of about 25° C. The organism grows equally well under aerobic and anaerobic conditions.

The reactions of P. kalmii in various media are characteristic of the Proteus group, in general, and follow closely the reactions of other bacteria in the genus causing septicemial diseases of insects. The growth on blood agar (sheep's blood, defibrinated) gives β hemolysis, according to the Streptococcus classification, in two days. Acid was usually produced in various carbohydrate media, however, at the end of three weeks practically all the acid produced in these media had been neutralized.

Transmission of this deasese among the insects in the laboratory culture was apparently by means of a common water supply, but cannibalism and food contamination may have been associated with the spread of the disease.

12. THE LOCALIZED NATURE OF BLACK WIDOW POISON.

JOHN PIERSON
Oregon State College.

Poison of the black widow spider is not found generally distributed in the body as formerly believed but is confined to the poison-secreting glands. Experiments employed to arrive at this conclusion are discussed.

Notes concerning:

1. Differences in the reproductive rate of the black widow in Oregon as compared with other sections of the United States.
2. Distribution in the Pacific Northwest.
3. Longevity.
4. Differences in cannibalism among immature males and females.

13. THE EFFECTS OF THEELIN AND CASTRATION ON THE KIDNEY OF *Anolis carolinensis*.

By MARY L. CLAPP and L. T. EVANS
Montana State University.

This study has been undertaken primarily to determine whether hormones which affect the gonads also affect the kidney of the lizard.

In a preliminary histological study of controls interesting differences in summer and winter kidneys were noted. The winter kidneys show definite regression in both sexes. There is little debris in the lumen of any of the tubules and the height of the cells in the distal tubules, for instance, is 19 micra as compared with 29 in the summer controls. Glomeruli are also smaller.

11 r. u. of theelin were injected into winter experimental animals. This has caused hypertrophy in females and degeneration in males.

Castration caused degeneration in both sexes. Injection of extracts from the anterior pituitary of sheep into castrated animals results in a kidney structure similar to controls.

It seems evident that the kidney is affected by gonado-trophic hormones and castration. Sex differences are maintained in the effects of these hormones on the kidney.

14. THE EFFECT OF VARIOUS ENDOCRINES ON THE X-ZONE OF THE MOUSE ADRENAL.

William F. Starkey
University of Pittsburgh.

A temporary intermediate zone has been described in the suprarenal cortex of the human fetus, which disappears shortly after birth. A similar "X-zone" is present in the mouse adrenal which persists after birth and shows a dimorphic sex-age relationship. This zone is known to disappear at the onset of maturity, in the male, but to persist in the nulliparous female over a span of 80-200 days. In event of pregnancy, the X-zone rapidly disappears. It would appear that endocrine elaborated at maturity and pregnancy cause a rapid and complete disappearance of this zone.

Injection treatment of albino mice with Progynon-B (Schering), the ovarian follicular hormone, for short periods (6 to 9 days) failed to affect the X-zone of young male and female mice, inhibted normal X-zone degeneration in adolescent and adult females and in adolescent males. Similar treatment with Oreton (Schering), or testosterone propionate, failed to affect the X-zone of young males and females, caused a rapid and complete disappearance of the X-zone of adolescent and adult females, but failed to affect the males of similar age.

Results have been obtained from short treatment similar to those described by previous workers only after extended periods of treatment.

15. STUDIES UPON THE ASSAYS OF TINCTURE OF NUX VOMICA.

S. G. Mittelstaedt, K. L. Kaufman
State College of Washington.

Tincture of Nux Vomica contains considerable oil, which fact renders very bothersome the separate determination of strychnine by the usual methods of alkaloidal analysis.

A critical comparison has been made of several assay methods for this preparation. The advantages and disadvantages of each have been indicated. The results obtained have produced suggestions for an improved method of analysis of tincture of Nux Vomica.

16. A BIOASSAY FOR FLUIDEXTRACT OF SENNA AND OTHER LIQUID CATHARTICS.*

K. L. Kaufman, S. M. Hauge and C. O. Lee
Purdue University.

A reasonably reliable technique for measuring the cathartic activity of fluidextract of senna has been devised. Using this new method, the following conclusions were reached as the result of numerous assays:

1. Fluidextracts of senna which had received the borax treatment described in the publications of Kaufman and Lee were slightly more active than non-treated samples.
2. Contrary to the opinions of many, the cathartic activity of fluidextract of senna is not influenced by the color glass in which it is stored.
3. Fluidextracts of senna which had been stored for long periods showed a slight decrease in cathartic activity.
4. The dosage required to produce catharsis in the white rat was relatively large.

18. WILD LIFE CONSERVATION IN GERMANY.

William Graf
Oregon State College.

This research deals with the findings of the author on a three months tour of investigation of the methods of wild life management used in Germany.

Scientific methods of solving the Biological problems in connection with the wild life are brought out as well as some of the ecological adaptations of the wild life to the abnormal environment in an over-populated country.

19. DOES THE GOLGI APPARATUS IN PLANT CELLS PLAY A PART IN SECRETIONS?

Banner Bill Morgan
Oregon State College.

During the school year of 1935-36 the writer had the opportunity to do research in studying the Golgi apparatus in normal animal cells under the direction of Dr. T. E. Weier. In the fall of 1936 a senior thesis was submitted by the writer to Dr. F. H. Smith dealing with abnormal conditions of the Golgi apparatus due to vitamin deficiencies. As most of the research has been done on animal cells, a new field was opened by trying to compare this structure with plant cells.

Just what is a Golgi apparatus? It is a peculiar blackening of certain types of fat materials in animal cells due to the impregnation of osmic acid or silver nitrate. The Golgi material is classified as a definite cellular or cytological structure and is associated with secretions in animal cells.

At the present time there is a controversy as to whether the Golgi apparatus exists in plant cells. For further information for or against this theory it is best to consult recent literature.

"It is thought that all living cells secrete digestive and oxidative enzymes, and all cells secrete their cell walls; but in certain numerous families of plants we find single cells or groups of cells called glands that carry on secretions as their special function."

"For the cytologist, at least, the problem of the origin of secretory products is very definitely located in the cytoplasmic area of the cell. The cytologist finds it always possible to observe at some time in a gland cell a group of granules which constitute the secretions produced by the cell. Glands must pass through internal changes which comprise a secretory cycle eventuating in the discharge of a secretion. It is assumed that in the beginning the cytoplasm of the gland cell is free from secretion droplets.

Recently the theory has been advanced by several workers that the Golgi material is concerned in the elaboration of secretions in the animal cell. It has been demonstrated with the goblet cells of the intestine. The secretion first appears in the form of minute granules along the strands of the basket-like Golgi net-work. The droplets pass toward the distal end or region of the cell where they collect in large masses and complete their growth. As they move away from the net, each is seen to have a small osmic acid cap.

With this thought in mind the writer started on the secretory cycle of the glandular hairs of the Geranium and Tobacco. A complete cycle has been worked out by the use of osmic acid vapor. This secretory cycle is essentially the same as that of animal cells but no Golgi apparatus could be seen. The small granules are formed by the osmic acid and gradually fuse to large droplets surrounded by a vacuole. The writer does not believe that secretions in plant glandular cells come from Golgi material. The work has been checked and rechecked. There is no mention in the literature of studies of secretions by plant cells due to the Golgi apparatus, so most of the work is original.

It would be futile to mention all of the technical methods used in the laboratory to demonstrate this secretory cycle, so reference is given to the works by this writer and other components of the Golgi apparatus.

More work is being done to determine the origin of the secretory granules in plant cells. The writer believes that they are metabolic products of the cell, and stimulated on the exposure to osmic acid.

20. STUDIES IN THE SOIL RELATIONS OF VIOLETS.

Herbert McCullough
University of Pittsburgh.

The majority of Violet species sampled in the present work show a definite tendency and range both in pH and soil requirements. V. scabriuscula is a cosmopolitan species; the pH range is very wide, from 5.4 to 8.1, and the plants grow in both poor and rich soils of various kinds. V. papilionaceae should be classed as a fairly acid species with a tendency of 5.0 to 6.0 and a range of from 4.6 to 8.2 pH; in habitat, it prefers fairly rich and moist soils. V. sororia is similar to V. papilionaceae in its soil relations. V. cucullata is always found in wet places and has a range of from 5.2 to 6.9 pH; V. triloba is always in dry woods and has a wider range, from 5.1 to 8.0 pH. These two species are rather specific in soil requirements.

It was found that these ranges of hydrogen ion concentration had no apparent effect on the growth of Violets. Other factors of the soil must be of greater importance than pH in the development of these plants. If the present work is considered conclusive, attempts to correlate pH and the quality of growth of Violets are useless.

21. IMPORTANT SOUTHWESTERN SPECIES OF *MUHLENBERGIA.*

Charlotte Goodding
University of New Mexico.

The genus *Muhlenbergia* was named for Rev. Dr. G. H. E. Muhlenberg (1753-1815), the American clergyman and botanist who wrote the first treatise on American grasses. It is a large group of grasses represented by more species than any other grass genus in the Southwestern States. Of fifty-five species listed for the United States, forty occur in the Southwest. They are seldom found in pure stands over large areas.

They are scattered over a wide variety of soils—from low deserts to subalpine regions, from marshy sites to arid situations.

A diversity of structure exists in this group. In height they range from only a few inches to five or six feet. The floral parts also show marked differences. The connecting link of all these diversified types is the 3-nerved lemma, which is sharp-pointed or bearded.

Although the group cannot claim a place among man's food plants, it includes many important range grasses. A few species are indicators of over-grazing on the ranges, others show possibilities as material for paper making and as ornamentals. Several species are excellent soil binders and these are being used in the Soil Conservation program.

22. THE VISCERAL ANATOMY OF THE KANGAROO RAT, DIPODOMYS.

Edward E. Midgley
University of Utah.

This problem, suggested and completed through the instigations of Professor W. W. Newby, and Professor Stephen D. Durrant, and Dr. Walter P. Cottam, all of the University of Utah, and Dr. A. Brazier Howell, of Johns Hopkins University, was investigated primarily to aid morphologists in the further study of comparative anatomy. If such a result can be obtained the study will have been deemed well worth while.

Specimens from two sources were used; one group of *Dipodomys microps levipis* from Southern Utah, and the other group of *D. ordii columbianus* from the shores of Great Salt Lake. This paper, therefore deals only with the internal anatomy of the genus Dipodomys. No attempt has been made to determine the extent of species and individual differences.

The paper includes a brief discussion of materials and methods used, a few notes on habits of the kangaroo rat and a picture of its external morphology as well as the study of the internal anatomy.

Four general topics are included in the study of the viscera: the Abdominal Viscera (Digestive), Abdominal Viscera (Urogenital), the Thoracic Viscera, and the Glands of the Head and Neck. The structure of each organ in regards to its relation to other organs, its size, shape, and weight, and its location and general external appearance are discussed fully.

A summary follows, listing ten major variations found in the kangaroo rat which differ from findings in other small mammals. A complete bibliography has been added and precedes a list of thirteen plates, which include drawings of each organ or system of organs and photomicrographs of the molar and ''hibernating'' glands.

The study is not exhaustive and further investigation, especially on the circulatory and nervous systems, is desirable.

23. AN INVESTIGATION OF THE TERMITE PROBLEM IN SALT LAKE CITY.

By Arden R. Gaufin
University of Utah.

In Utah there are only three species of termites to be found. Only two of these, *Reticulitermes tibialis* Banks and *Reticulitermes tumiceps* Banks, have been heretofore reported. During the course of the present survey the author found a species of termite, *Kalotermes minor* Hagen, which represents both a new genus and species for the state. In Salt Lake City only one of these forms, *R. tibialis* Banks, was found. This later species was found widely scattered over the state as a whole.

During the course of the survey moisture conditions were found to have greatly influenced the activities and distribution of termites in the regions considered. Temperature was found to play a significant part in determining the activities of the species in Salt Lake City.

During the two years covered by the survey, termites were found working in many houses representing a variety of structural conditions. The damage ranged up to $3,500.

In the majority of cases considered the termites were found to have gained entry to the buildings affected by means of cracks in cement foundations and subfloors or by means of wood in contact with the ground. In every case it was recommended that these conditions be rectified at the time the repair work was done.

24. RELATIONSHIP OF HABITAT TO OXYGEN CONSUMPTION BY CERTAIN ESTAURINE CRABS.

John C. Ayers
Duke University

The oxygen consumption per gram of body weight per hour of the estuarine crabs: Menippe mercenaria De Haan; Libinia dubia H. Milne-Edwards; Callinectes sapidus Rathbun; Panopeus herbstii H. Milne-Edwards; and Eurypanopeus depressus Smith were determined by a modified Winkler method.

Menippe, Libinia, and Callinectes live always below low tide and were found to require 0.51, 0.42, 1.14 cc. of dissolved oxygen per gram of body weight per hour, respectively.

Panopeus and Eurypanopeus are intertidal forms which hide beneath shells and debris along the beach when the tide is low. Panopeus used 0.88 and Eurypanopeus 1.07 cc. of oxygen per gram body weight per hour.

The evidence will be discussed as evidence for the migration of crabs to land over the open beach.

25. THE SPIRAL URGE IN TWO SPECIES OF FLATWORMS.

Kenneth M. Richter
University of Oklahoma.

The purpose of this study was to determine if the inherent phenomenon of movement in a spiral or circular course were present in the flatworms and its underlying factors. The specimens used were *Planaria maculata* and *Phagocata gracilis.* Both normal, naturally abnormal and mutilated specimens were used. A tracing tray was improvised by which the animals' movements could be accurately recorded. Conclusions: 1. The "spiral urge" is present in *Planaria maculata* and *Phagocata gracilis.* 2. *P. maculata* made loops to the right to the extent of 85%, and *P. gracilis* to the extent of 76%. 3. Individuals of the same species made similar loops. 4. Each species had a characteristic loop pattern. 5. *P. gracilis* can be so controlled as to cause it to turn invariably in only one direction by destroying its locomotory symmetry. 6. On the basis of natural abnormalities, spiral movement would seem to be under the direct control of an automatic-nervous mechanism.

26. THE INHERITANCE OF LEAF FORM IN *TARAXACUM PALUSTRE VAR. VULGARE.*

Charles Clinton Smith
University of Oklahoma.

It is commonly supposed that the observed differences in the leaf forms among *Taraxacum palustre var. vulgare Lam.* plants is due to difference in age or to environment. Indeed age does produce increasing degrees of dissection, while rejuvenescence following blooming or multicipital branching brings about a return to the juvenile form.

If age is the controlling factor, then plants of the same age growing under the same environmental conditions should show the same leaf forms.

The purpose of this experiment was to see if seed from plants with different leaf forms would produce seedlings with the parental differences when grown under the same environmental conditions.

Seed heads were gathered from 36 different plants of *Taraxacum palustre var. vulgare* differing from each other in leaf form. The seeds were planted and the seedlings grown together so that they were all provided with the same environmental conditions.

From the first there was a great deal of difference in leaf character among the different sets of seedlings but these differences were decidedly lacking among members of each set of seedlings. As the cultures grew older, the members of each set of seedlings came to resemble the leaf-type of the parent plant. Never at any time was the resemblance between members of different sets of plants any closer than it had been between the parent plants.

From the results of the experiment, it became evident that the leaf form of the parent is passed on to the offspring.

Sears and others have shown that the members of the genus *Taraxacum* reproduce almost entirely parthenogenetically. Sears found that the functional embryo sac arises from a process of maturation in which there occurs essentially two homotypic divisions followed by the development of the seed and fruit with no pollination. Other methods of maturation were found by Sears but they did not lead to fertile seed production. Sears applied the term amiotic parthenogenesis to this method of seed production. As the term implies, no reduction occurs, therefore no fertilization is necessary to maintain the chromosome complement typical of the species.

If the above is true, then each seedling should show any morphological peculiarity due to genetic influence possessed by the parent plant the same as in vegetative method of reproduction. Such was the case in this experiment.

27. THE OCCURRANCE OF *ASTER SPINOSUS* IN CENTRAL OKLAHOMA.

Charles Clinton Smith
University of Oklahoma.

Wootin and Stanley give the range of *Aster spinosus Benth.* as Utah to California, Texas and New Mexico and southward with the type locality as Mexico. Munz extends its range into Central America. The author recently found two large patches of the plant growing on low sandy ridges on the flood plain of the South Canadian river, associated with *Panicum virgatum, Phragmites communis, Populus deltoides, Salix spp., Erigeron canadensis* and *Equisetum hymeale.*

This extends the known range of this plant; known as "Mexican Devil Weed" approximately 350 miles eastward.

The plants are growing at present on an older portion of the flood plain, beyond the Tamarix-Populus association which characterizes the 2nd and 3rd levels of the flood plains of the South Canadian river in this area. The plants appear to have been established in their present location for at least five years.

By studying a map showing the headwaters of the South Canadian river, it may be seen that the plant has probably been brought from its older range by flood waters. Further study probably will reveal its presence along the river toward its headwaters and perhaps further down stream.

28. WILDLIFE AND ROADSIDE EROSION IN CENTRAL OKLAHOMA.

Charles Clinton Smith
University of Oklahoma.

During the past year a study was made of roadside erosion, its causes and effects. The causes and general effects have been taken up in some detail in another publication. The part played by roadsides in wildlife in our present system of agriculture is little known or understood.

Many workers and writers on wildlife have pointed out the importance of roadside vegetation in the maintenance of wildlife in regions where agricultural practices have eliminated nesting and protecting cover. Darling, Gabrielson, Grange, McAtee, Osborn, Whitaker, Stoddard and others point out the fact that roadside vegetation provides a type of food and cover highly suited to the use of wildlife. The presence of game animals in a region often depends upon the presence of food and cover provided by roadside plants.

Important food and cover plants found stabilizing roadsides in the five central counties of Oklahoma, (Canadian, Cleveland, Kingfisher, Logan and Oklahoma) are *Helianthus spp., Solidago spp., Aplopappus ciliatus, Ambrosia spp.,* a great many herbaceous legumes, *Robina, Ulmus spp., Prunus spp., Symphoriocarpos, Quercus spp., Rhus spp., Celtis spp., Cornus spp., Juglans, Carya, Diospyros virginiana, Sapindus, Andropogon spp., Paspalum* Elymus as well as others.

Roadside erosion affects wildlife in two ways: first, a direct effect upon the animals that inhabit the roadsides and second, an indirect effect upon the inhabitants of streams and lowlands.

The first affects: (a) nesting cover (b) protection, and (c) food of small mammals and birds.

The second effect may be subdivided into: (a) destruction of food and nesting ground in low areas because of flooding and silting, (b) filling of streams and ponds with silt causing (1) death of adult fish due to direct effects of silt, (2) death by starvation due to upsetting of food cycle when water is permanently roiled, (3) destruction of breeding grounds.

Some erosion of roadsides is unavoidable and probably would not do a great deal of damage. The greatly accelerated erosion is due to present methods of construction and maintenance of roads. Damage may be traced to the following factors. (1) Use of the conventional "V" shaped roadside ditch, with its steep back-slope (2) frequent use of the road grader instead of the road drag for road maintenance (3) frequent destruction of vegetation in ditches and on back slopes (4) misplaced drainage structures (5) excessive concentration of runoff.

29. CYTOPLASMIC INCLUSIONS IN THE MALE GERM CELLS OF *NOTONECTA UNDULATA SAY.*

Kenneth M. Richter
University of Oklahoma.

The behavior of the cytoplasmic inclusions during the course of spermatogenesis was traced from the primary spermatogonia to the mature spermatozoa. No inclusions were visible in the primary spermatogonia. Later spermatogonial stages showed the differentiation of the mitochondrial cap, and the differentiation of the chromophilic and chromophobic Golgi substances into two morphologically distinct bodies which fused to form a structure very similar to the idiosome of Meves. During the growth period the mitochondria scattered throughout the cytoplasm; the two types of Golgi substance again became morphologically distinct. The chromophobic Golgi body was transformed into numerous idosomal spheres, while the chromophilic Golgi body increased in size and took up an eccentric position on the nucleus. Just prior to the time of the active meiotic divisions, a centriole appeared within the Golgi cap. As the centriole divided, so did the chromophilic Golgi cap. Soon after this, the cap fragmented to small granules. These chromophilic Golgi granules fused with the idiosomal spheres (chromophobic Golgi) to form bodies similating the typical duplex-natured dictyosome. In the spermatid the mitochondria gave rise to the axial sheath of the mature sperm; the newly derived dictyosomes fused to form the acroblast and contributed to the formation of the acrosome. An empty vesicle was given-off by the acroblast which corresponds to the acrosomal vesicle of other species. The perforatorium is formed by the differentiation of both the acroblast and the acrosomal granules. The topographical homology of the Golgi complex in the insects, pulmonates and vertebrates would seem to be more clearly established on the basis of its behavior in this species, *Notonecta undulata.*

30. FACTORS INVOLVED IN BIRD MIGRATION.

Mary D. Brown
University of Utah.

In this paper an attempt was made to set forth the theories of bird migration and to give a critical analysis of the theories. The theories of the literature were discussed and analyzed. A new theory of Seasonal Response was advanced. This theory suggests that migration may be regarded as an adaptation to seasonal change, originating in temporate zones and comparable to such seasonal adaptations as the deciduous habits of trees; the hibernation of terrestrial cold-blooded animals; and the changing coats of fur and feathers to suit the seasons. Dr. A. M. Woodbury who proposed this theory also suggests that this adaptation to changing seasons has been produced by the great environmental forces of the rhythmically recurring cyclical fluctuations, acting upon the hereditary mechanism in such a way as to perpetuate those variation in heredity which made the physiological rhythms coincide with the rhythmical fluctuations of the environment.

The thesis concludes that theory holds that migration was caused by the incessant hammering forces of the seasonal fluctuations upon the physiological rhythm, inducing a seasonal response; that by natural selection those that made the proper migratory response survived to produce their kind; that migration is stimulated today by some biological change in the bird and an inherited seasonal response; that the routes and destinations have been set by natural selection among the migrating birds, inducing racial custom and have been gradually changed during the past ages; that changes in the routes are being gradually made today; that birds follow these routes by means of a certain racial response and by memory and sight; that because of a gregarious instinct and a remarkable memory a return is often made to the exact nest or house occupied the previous season.

31. BIRDS OF PINON AND SHADSCALE NEAR PRICE, UTAH.

Ross Hardy
University of Utah.

Two years' study (1935-37) shows that 125 species of birds visit the *Pinus edulis and Atriplex confertifolia* areas of East-Central Utah (Altitude: 5500′-8450′; Rainfall: 10.66-13.55 in. annual; Temperature: 68.1-71.3° F.).

The number of species varies directly with the volume of vegetation, which is dependent upon moisture, altitude, soil quality and exposure. Nesting species number forty-three, ten being permanent residents. Nineteen winter visitors and sixty-three migrants, foragers and stragglers complete the list.

The Book Cliffs (East-west axis; 10,000′ altitude) retard spring migration during stormy periods. Reptiles, native mammals and man with his overgrazing flocks regulate the bird population. Aridity and its small amount of plant cover, needed by birds for shelter and food production, has a marked effect upon avian behavior. Shadscale nesters must acquire a large territory or forage in other areas. Lack of shelter makes them wary. Some birds are obligated to pinons and decrease according to an increase in cultivation.

The check-list is based upon more than three thousand records of the species whose skins were collected. The material should help in a better understanding of the Pinon-Juniper and Greasewood-Shadscale Associations.

32. THE HYDNACEAE OF WESTERN WASHINGTON.

William Max Lanphere
University of Washington.

The Hydnaceae is a family of the Agaricales or higher fungi which is characterized by the presence of downward directed spines, warts, or folds that have not originated by the breaking up of spores. The spores are borne on a hymenium which covers the outer surface of the spine.

This problem is concerned with the collection, classification, and description of the members of the family. Inasmuch as no extensive work has been done on the group in this region, this study may be considered as a more or less pioneer attempt to classify the members of the Hydnaceae of western Washington.

Collections were made over a considerable area in this region. Specimens were identified by means of the works of American and European workers. One new species and several new combinations were made. Miller, in his Hydnaceae of Iowa has done much in clarifying the confusion which previously existed concerning the taxonomy of the family. His classification has been closely followed in the present paper. Dried specimens from the collections may be found in the mycological herbarium of the University of Washington.

Thirty species in the following genera have been collected, identified, described and prepared as herbarium specimens: *Odontia, Oxydontia, Radulum, Mucronella, Steccherinum, Auriscalpium, Hericium, Dentinum, Hydnun, Calodon, Echinodontium,* and *Irpex.* The last two are usually considered as belonging to the Polyporaceae. Since students are likely to be confused by the mature sporophores, these are also included.

33. THE INHERITANCE OF ODORLESSNESS IN MARIGOLDS.

Jerome H. Kantor
Bucknell University.

Odor in marigolds is due to a substance called tagetone, an oil belonging to the olefine terpene series of chemical compounds. Most strains of marigolds exhibit the odor due to this essential volatile oil. Two strains which do not show this odor have been studied. The lack of odor is due to deficiencies in the secretory glands. In the one strain the glands are mostly or completely aborted, while in the other strain the glands are present but fail to secrete the oil. Evidence is given to show that in one strain the inability to secrete the oil is inherited as a recessive Mendelian character, obeying the laws of a simple recessive. The other type also produces odorlessness, although different both genetically and morphologically. Hybrids involving odored and odorless plants exhibit the phenomenon known as hybrid vigor, and also show the expected segregations in the second and third generations.

* * *

EDITORIALS

Once A Phi Sigma, Always!

THE surprising action of the eighth national convention at Indianapolis, in which the annual dues were abolished, bodes well for the future of Phi Sigma. It can be productive of several desirable results. It is not the initiation fee which so much deters prospective members from accepting the honor of membership. It is rather the disquieting prospect of a steady drain on personal resources for the duration of college or university attendance. In the future this deterrent will not exist. Membership committees, by adopting the slogan: ''Once a Phi Sigma, always a Phi Sigma!'' should have no difficulty convincing eligible candidates of the desirability of accepting membership. Nor is this the only good effect to be expected from the convention's action. Henceforth every past initiate of Phi Sigma becomes an active member in good standing as long as he does not acquire the status of faculty member. They also become eligible to receive each issue of the Biologist. This should do much to stimulate interest in the meetings and other activities.

There are only two flies in the ointment. One is the possibility of chapters charging exorbitant local annual dues. The other fly is the possibility of chapters cutting down on the number of annual initiations. In both ways a chapter might very easily defeat the action of the convention delegates,—and cut its own throat,—all of which is no remote possibility. Practically every inactive chapter on our rolls went out of existence through some such practice.

The Convention Notable

THE Indianapolis meeting of Phi Sigma will go down in our history for many reasons. It was the eighth biennial national meeting. It was one of the best attended in our history. It was the most business-like and expeditious in handling agenda. It took several drastic actions, even on matters not on the agenda, for the future good of the organization. It boldly attacked a mass of non-essential but ticklish details and calmly disposed of them. It suspended the annual dues for two years. It established, on every campus having a chapter, an annual award for the student most excellent in biology. It carried out two notable programs of research reports. It held a banquet at which the main speaker was Dr. A. Ruthven, president of the University of Michigan.

Campus Editions

FUTURE issues of *The Biologist* will be devoted to various campuses which harbor chapters of Phi Sigma. The policy was not carried out in this issue due to the amount of convention matters scheduled for publication. Chapter officers, however, who are interested in this program are invited to correspond with the Editor. By introducing photographs and articles on the various institutions interesting issues are assured.

Gentlemen, Our Advertisers!

WITH the advent of the Denoyer-Geppert people to our pages the number of nationally known concerns advertizing in *The Biologist* continues to rise. With the change in membership status resulting from the action of the convention our active membership receiving copies of *The Biologist* should increase materially. Both facts can be productive of much mutual profit. More readers will mean more patrons for our advertisers. More patronage for our advertisers will mean more advertisements. All of which is, of course, predicated on our patronizing those who advertise with us. Loyalty to Phi Sigma, no less than self-interest, should impel us not only to give these firms our business, but also remind them that we are doing so because of their advertising in *The Biologist.*

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BOOK REVIEWS

The thumbnail sketches of current biological literature appearing in this section are not meant to be exhaustive or deeply critical. They aim to survey the rapidly growing field of biology. Naturally these reviews represent the candid opinions of various readers not necessarily those of members of the National Council, nor even those of the Editor.

AFRICA'S GOD, J. J. WILLIAMS, *Boston College Press, Chestnut Hill, Mass., 1937. $1.00.*

This issue of the Boston College Anthropological Series initiates the discussions on the religious concepts of the eastern peoples of Africa. Those who investigated the first series of papers will not need to be encouraged to continue their study of African anthropology. The bibliography is, if anything, more comprehensive.

ALCOHOL; ONE MAN'S MEAT, EDWARD A. STRECKER AND FRANCIS T. CHAMBERS, *The Macmillan Co., New York, 1938. $2.50.*

This book is divided into two headings,—the Psychology of Alcoholism, and the Treatment of Alcoholism. Both afford most interesting, and undeniably profitable reading. The authors are competent to discuss the problem, and the results of their experience and experiments offer us one of the most intelligent approaches to a solution of one of our great national problems that has yet appeared. Anyone who has to deal with the problem of alcoholism, either as parent, educator, physician, or public official, will profit by a careful study of this book.

ALLURING WISCONSIN, FRED L. HOLMES, *E. M. Hale & Co., Milwaukee, 1937. $2.00.*

The slogan, "See America First," originated during the early days of the World War, and fearful Americans discovered America for the first time. Since then many local agencies have published guide-books and treatises about places and scenes worth "doing" in this country. States have been slow to adopt the practice, however. With the discovery that the Middle West had a summer playground as interesting and as beautiful as New England, or the Appalachians, it was natural for Michigan, Wisconsin and Minnesota to become avidly interested in the possibilities of developing the tourist trade to their own advantage. This was done by exhibits at the Century of Progress Exposition, by railroad and steamship advertising, and the like. Comes now the second stage in the process. Travellers are beginning to publish the results of their achievements with camera, brush or pencil. "Alluring Wisconsin" belongs to the camera class. That Mr. Holmes has succeeded in his aim will be a matter of pleasant surprise to all readers of this work, but most of all, those from Wisconsin.

AMERICAN EDUCATION, JAMES ROWLAND ANGELL, *Yale University Press, New Haven, 1937. $3.00.*

Careful study of these accumulated addresses by Yale's noted president lends conviction to the thought that here is a very human series of documents. It is easy to trace the maturing of Dr. Angell's ideas and objectives from the earlier to the later papers. (Unfortunately they are not all in chronological order.) To this editor his finest and most outspoken work is in the baccalaureat addresses of 1930, '32, '34, and '36, where he bravely faces the issues of the times. As a picture of changing collegiate relations in an era of world change this book is of permanent value.

ANIMALS ON THE MARCH, W. MAXWELL REED AND JENNETTE M. LUCAS, *Harcourt Brace and Co., New York, 1937. $3.00.*

A half-dozen or so of our best known animals, domesticated or wild, are here popularly treated from their prehistoric ancestors down to the known forms in home or zoo. There is an entirely adequate bibliography for so general a work. It will be of value on the evolution shelf in public and high school libraries.

ANOMALIES AMONG ANTS, William Morton Wheeler, *Harvard University Press, Cambridge, 1937. $2.00.*

This is the last entomological paper of Dr. William Morton Wheeler. It was brought to the printer by the great Harvard scientist just a few days before his death last winter. Aside from this sentimental attraction which might impel other scientists to desire a copy of Wheeler's last paper, the article is of unusual interest, dealing as it does with the population of a Trinidad ant-colony in which 164 anomalous individuals occurred, exhibiting caste characteristics regarded as offering solutions to problems over which entomologists have puzzled for years.

AXIAL BIFURCATION IN SERPENTS, Bert Cunningham, *Duke University Press, Durham, N. C., 1937. $2.50.*

Teratological forms are known throughout almost every carefully studied animal group, including man. A careful study of bifurcation in the snakes, as it manifests itself in double heads, double tails, or doubled spinal columns, makes up the theme of this unusual book. Not only are the specimens very carefully documented, they are also carefully figured, either in drawings, photographs or X-ray pictures. It is a scholarly piece of work in a field not overrun.

THE AXIOMATIC METHOD IN BIOLOGY, J. H. Woodger, *The University Press, Cambridge, England, 1937. $3.75.*

The author of this unusual volume calls it "an experiment in the application of the methods of the exact sciences to biology." The result is a purely biological calculus. Those who are interested in the more or less practical application to biology of the "Principia Mathematica" of A. N. Whitehead and Bertrand Russell will have a lot of fun with this book. For the ordinary biologist, confused by "the growing, untidy, confused part" of his science, considerably more of the "time and patience, paper and pencil" which the author prescribes, will be necessary than he may care to give.

COLLATERAL READINGS IN INORGANIC CHEMISTRY, edited by L. A. Goldblatt, *D. Appleton-Century Co., New York, 1937. $1.35.*

Biologists who are stumbling through required courses in chemistry will be interested in this new publication. For beginning students in chemistry who have not yet acquired the habit of "browsing" through the current issues of scientific magazines in the college library, this collection of photostated articles from outstanding magazines from 1912 to 1937 may prove a revelation as to what they have been missing. Aside from any particular arguments as to whether this is the proper way to stimulate student outside reading or not, we can always fall back on the old saw: "there's more than one way to skin a cat."

A COUNTRY GARDEN, Ethel Armitage, *Macmillan Co., New York, 1936.. $3.00.*

A gardner's diary from March to the succeeding February, chattily describes the life of an English garden, its plants, its insects and above all, its birds. The author's unperturbed chronicle, and the striking wood-cuts of John Farleigh, make this a delightful gift-book for your horticulturally minded friends.

THE DEVELOPMENT OF THE VERTEBRATE SKULL, G. R. de Beer, *At the Clarendon Press, Oxford, 1937. $10.00.*

From the cyclostomes to the mammals, the author of this monumental work has described the paleontological, embrological and anatomical development of skulls, using a uniform nomenclature. Representing as it does an extraordinary careful organization of a tremendous literature, together with excellent illustrations, and a copious bibliography, this work automatically becomes a "must" in the zoological library.

EARLY MAN, edited by George Grant McCurdy, *J. B. Lippincott Co., Philadelphia, 1937. $5.00.*

There was an international symposium on prehistoric man held at the Academy of Natural Sciences in Philadelphia last March. The papers presented there in person, or read by title, are here gathered for publication. It would be hard to imagine a more brilliant list of contributors, nor a more profoundly impressive series of subjects discussed, anywhere available within the covers of one volume. Despite the popular "blurb" on the jacket of the book, it is really not such easy reading. To the scholar, however, and the student of anthropology it will be valuable.

THE FRESH WATER ALGAE OF WOODS HOLE, MASSACHUSETTS, Hannah T. Croasdale, *Published by the Author, Philadelphia, 1935. $1.00.*

Students of the freshwater algae of the Woods Hole region, as well as of all the post-glacial areas of southern New England, will welcome this compact manual in their taxonomic work. The hundreds of former students who "did" the course in algae at the Marine Biological Laboratory in years gone by, will relish the extensive and accurate series of maps with their comprehensive annotations of the various collecting stations.

GUIDE TO EASTERN FERNS, Edgar T. Wherry, *Science Press Printing Co., Lancaster, Pa., 1937.*

The eastern ferns are here happily chronicled in a pocket-sized book, under five different heads,—history, features, habitat, range, and remarks. Among botanical handbooks this deserves a high place, if for no other reason that the illustrations are really helpful.

INTRODUCTION AND GUIDE TO THE STUDY OF HISTOLOGY, Avery E. Lambert, *P. Blakiston's Son & Co., Philadelphia, 1938. $5.00.*

This is an entirely new volume based on the author's previous manual for students in medical schools and colleges. It is not for students who are interested in general histology. Its main purpose is to supply a foundation for future work in physiology and pathology. There are, therefore, no methods offered for the preparation of materials. The book is unusual in the field it prescribes for itself, in that it requires no additional laboratory manual or outline. The author is to be congratulated on this innovation.

HISTORICAL DEVELOPMENT OF INSECT CLASSIFICATION, H. F. Wilson and M. H. Doner, *John S. Swift Co., St. Loius. 1937.*

This is certainly not a book for the average, or considerably more than average, reader. It is a well-documented, scholarly presentation of the subject, very compactly gotten together. As a reference work in the evolution of insects, and insect taxonomy, it will be particularly valuable.

HISTORY OF LAND MAMMALS IN THE WESTERN HEMISPHERE, William Berryman Scott, *The Macmillan Co., New York, 1937. $7.50.*

This entirely rewritten revision of the original 1913 volume will continue the tradition which is by way of making the author's first volume a geological classic. Dr. Scott has contributed much to the paleontological knowledge of early North America. It is distinctly opportune that, as an emeritus professor at Princeton, he should devote the ripened maturity of his long experience to a complete revision of his earlier work. College libraries everywhere, and teachers of paleontology will want to have this new work.

FUNDAMENTALS OF ANATOMY, Carl C. Francis, *C. V. Mosby Co., St. Louis, 1937. $2.75.*

With 176 new illustrations, 26 of which are in color, this slim volume makes a very adequate survey of human anatomy. B. N. A. terms are used throughout. While the book will be of undoubted value in anatomy and other medical courses, it is easy to see where it could become a very reliable aid to the grade or high school teacher in hygiene or physiology classes.

GENERAL BIOLOGY, E. Grace White, *C. V. Mosby Co., St. Louis, 1937. $3.00.*

The word "Evolution" does not exist in the terminology of this second edition of a standard textbook. Careful study of the text matter, the glossary and the table of contents fail to reveal the term prescribed in the sunny regions of our "Bible Belt." This does not mean that the subject is not adequately treated. Natural selection, and phylogenies are present, but the author has most skillfully avoided any direct use of terminology which might fall under legal suspicion. It is an adequate text which will fill a needed place in the less enlightened areas of our country.

HUMAN VALUE OF BIOLOGY, Johan Hjort, *Harvard University Press, Cambridge, 1938. $2.50.*

The famous oceanographer here gives us his philosophy of biology. He insists that this philosophy should be formulated by biologists, not by physicists or mathematicians. He opens his work with a sympathetic review of biological history, from Aristotle down to modern times. Modern biology is interpreted in the light of Kantian principles. The author is not in sympathy with the theories of Karl Marx, and deduces from his study of living populations in oceanography that the principles of population biology must be basic to an intelligent sociology, politics or government.

LABORATORY MANUAL FOR GENERAL BIOLOGY, Leslie A. Kenoyer and Henry N. Godard, *Harper & Brothers, New York, 1937. $.75.*

As a companion to their excellent textbook published last year this laboratory manual would seem to leave little to be desired. The perforated pages can all be removed and, since they are already punched, can be filed with the drawings in a loose-leaf notebook. The drawings are also similarly treated. They only need to be removed, labelled and filed.

LABORATORY OUTLINES FOR ANIMAL BIOLOGY, Michael F. Guyer and Halcyon W. Hellbaum, *Harper and Brothers, New York, 1937. $1.75.*

This volume was designed to accompany the senior author's textbook. It is uniform with it in binding and format. There are blank pages for original sketches by the student. Occasionally these are supplied, and all that is required is the identifying labels. At the end of a course in which this manual is used, the student has a permanently bound record of his work. It has much to commend it.

LIFE LONG AGO, Carroll Lane Fenton, *Reynal & Hitchcock, Inc., New York, 1937. $3.50.*

For inquiring youngsters who want to know something about fossils one could hardly find a more attractive book. It will be for more than one the "open sesame" to hours of enchantment. The material is well arranged, delightfully illustrated in black-and-white and colors, and most intelligently written up. As a library book nothing better could be recommended. As a gift book for a wide-awake young person nothing better could be desired.

LIFE IN INLAND WATERS, James G. Needham and J. T. Lloyd, *Comstock Publishing Co., Ithaca, N. Y., 1937. $3.00.*

More of an ecology than a limnology, this is one of the most attractive freshwater biologies we have yet seen. The instructor in general biology, whether in college or high school, who is interested at all in field work, will want to have in his library a copy of this valuable work. The wealth of information, suggestive material, and excellent photographs should be an incentive to further interest in this most stimulating field of nature study.

MAN, BREAD AND DESTINY, C. C. Furnas and S. M. Furnas, *Reynal & Hitchcock, New York, 1937. $3.00.*

The part of a person's life which is spent at the table is not inconsiderable. It is strange in an age which balks at considering nothing too unimportant for profound study, or cheapest humor, that this sort of a book has had to wait so long for a writer. Historically, physiologically and aesthetically the authors have considered the subject of food and nutrition. It merits a place in every public library, but college people could well afford to read it too. As a group they show no better intelligence in their choice of food than most of the absolutely uneducated.

MARINE ALGAE OF THE NORTHEASTERN COAST OF NORTH AMERICA, William Randolph Taylor, *University of Michigan Press, Ann Arbor, 1937. $5.00.*

Dr. Taylor's new book is to the marine algae of New England and adjacent waters what G. M. Smith's in-

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RECENT ADVANCES

IMMS—Recent Advances In Entomology, 2d Edition. Enlarged With 94 Illustrations. 431 Pages. Cloth $5.00. By A. D. Imms, M.A., D.Sc., F.R.S. (University of Cambridge).

DARLINGTON—Recent Advances In Cytology. 2d Edition, Enlarged. 16 Plates. 160 Text Illustrations. 81 Tables. 671 Pages. Cloth $6.00. By C. D. Darlington, D.Sc., Ph.D. (John Innes Hort. Inst. Eng.).

EVANS—Recent Advances In Physiology. 5th Edition. 120 Illustrations. 500 Pages. Cloth $5.00. By C. Lovatt Evans, Sc.D. Revised by W. Newton, M.D. (University College, London).

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valuable work is to the freshwater forms of the United States. It is a much needed work, and one that deserves a place on the shelves of every botanical library in this country and Canada. This for two reasons, among many:—first, the book is much needed and excellently done, supplanting as it does a number of out of date or out of print earlier references; second, the long experience of the author as an instructor at the Marine Biological Laboratory in Woods Hole, warrants a first hand knowledge of his subject matter which cannot be equalled in these United States. The University of Michigan Press is to be congratulated on accepting Dr. Taylor's work, and for doing so well by it.

METHODS IN BIOLOGY, Alfred C. Kinsey, *J. B. Lippincott Co., Philadelphia, 1937. $2.50.*

As an aid in organizing biology courses, in discovering new angles from which to approach biological subjects, and in general to clarify the main objectives in biological teaching, this book fills a much needed place in our libraries. This does not mean that it should be consigned to the reference shelf for books on teaching methods. It does mean that this volume should be in the personal, as well as the institutional library, wherever there is a teacher of biology or a biological course to be taught.

METHOD OF ANATOMY, J. C. Boileau Grant, *William Wood & Co., Baltimore, 1937. $6.00.*

Here is a new book on a subject as old as Vesalius, and probably, up to now, no more intelligently presented than it was by the Father of Anatomy. Tired of old ways of presenting old facts, the professor of anatomy at the University of Toronto has evolved a new presentation based on the principle of regional correlation. To a biologist it appears most intelligent, and if it gets our young medicos to thinking of body areas as units, rather than as composed of parts of highly unrelated systems, it will be accomplishing much toward ridding medicine of one of its most baneful concomitants, the utter reliance on what the author calls a memory that is wax to receive and marble to retain.

PRACTICAL TREE SURGERY, Millard F. Blair, *Christopher Publishing House, Boston, 1937. $4.00.*

Anyone who has ever paused to watch the smoothly efficient work of a crew of reputable tree surgeons has probably registered a mental resolution that if any of his own trees should become decayed some such crew of experts will be called in. Tree surgery has come to be a very definite profession, with its own techniques, tools and terminology. In this book, however, the unexpected and the unbelievable occurs. The head of a reputable firm of tree surgeons gives away the secrets of his profession. As such the book challenges our attention. There is small likelihood of this procedure being too rapidly copied. Not all tree surgeons have this author's educational background, and very few of them would be as altruistic.—This is a book for the horticultural, the forestry, the entomological shelf in your library.

THE RISE OF A UNIVERSITY, edited by W. F. Russell and E. C. Elliott, *in two volumes, Columbia University Press, New York, 1937. $3.75 a volume.*

Based on the annual reports of Presidents Barnard and Butler, these two volumes chronicle the story of Columbia's rise to fame as a world center of intellectual importance. The references to the development of the sciences during Dr. Barnard's regime are an all too common experience in every American college. The clear-thinking of Dr. Butler has contributed not a little to the rise of the great faculties which make up the Columbia of today. It is not for nothing that his envious contemporaries sometimes, not without malice, refer to him as "Nicholas Miraculous Butler,"—perhaps the sincerest tribute the learned doctor could expect.

SEA-HORSE ADVENTURE, Irmengarde Eberle and Else Bostelmann, *Holiday House, New York, 1937. $2.00.*

Anyone who was fortunate enough to go through the Aquarium when there happened to be one of those rare exhibits of living Hippocampi on display could recall how people crowded

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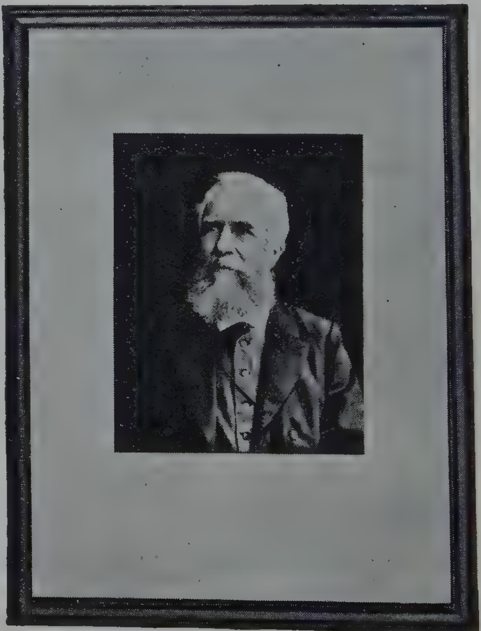

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around the exhibit, and what weird comments were made. As a group, the sea-horses are neither as numerous nor as hardy as some of their piscatorial relatives, the pipe-fishes, for instance. Never-the-less, the sea-horses have long been a special predilection of sculptors, artists, engravers along with other semi-mythical sea beings like the dolphines, the flying-fish and the octopi. When, therefore, an artist and one of Dr. Beebe's expedition technicians unite in producing a children's book on the sea-horse, it may not be unexpected if a lot of grown up youngsters pick it up, follow through its slim, beautifully decorated pages, and lay it down with a sigh for the wonders of childhood for a moment recaptured.

SOURCE BOOK OF BIOLOGICAL TERMS, Axel Leonard Melander, *College of the City of New York, New York, 1937. $1.10.*

Anyone who has taught biology, or attended sessions of biological societies, has had his ears assailed by orthoepic barbarities beneath the dignity and responsibility of scientists or teachers, if not of graduate students. Dr. Melander's book is designed to correct these barbarisms. This does not mean that it is a prosy, dry sort of treatise,—exactly the opposite is the case. It is easy reading, anecdotal, interesting. Young scientists who cannot be helped by this work are impossible.

SWIFT MOVEMENT IN THE TREES, Phyllis Kelway, *Longmans Green and Co., New York, 1937. $2.50.*

A photographer of no mean attainments, a student of nature, and an animal-behaviour interpreter, are combined in the author of this attractive volume, which should have a ready sale as a gift-book, and as an interesting addition to the library shelf on natural history.

THIS IS OUR WORLD, Paul B. Sears, *University of Oklahoma Press, Norman, Okla., 1937. $2.50.*

The University Press of the Oklahoma state university and the head of its department of botany have again pooled their resources to produce one of those distinctive books which we have come to expect from Norman. Dr. Sears stepped into the national literary spotlight a little more than a year ago with his thought-provoking book, "Deserts on the March." It speedily became a national best-seller in scientific circles. His new book is no less thought-disturbing, and the work of the university printers is just as effective. Here he assays the role of synthesizer of scientific thought and accomplishment, in the interests of society at large, an ecological project of enormous proportions. It is to be hoped that the superfluity of international panaceas now flooding the intellectual market will not dim the light Dr. Sears has set aburning.

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